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Thermochemistry of heteroatomic compounds. Part 5 [1]. Enthalpies of vaporization and solvation of tetracoordinated phosphorous derivatives

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Abstract

The enthalpies of vaporization of different classes of tetracoordinated phosphorous compounds have been determined according to their enthalpies of solution in hexane and carbon tetrachloride. Good agreement of some values with literature data is established. The enthalpies of specific (hydrogen bond) interaction of derivatives having acid properties, with *p*-xylene, dioxan and acetone have been determined. The enthalpies of solvation of cyclic and acyclic derivatives of methylphosphonic acid in different solvents are analysed and discussed.

INTRODUCTION

The chemical behaviour of organophosphorus compounds in many respects depends on the influence of the medium in which the processes occur. At the same time the influence of the solvent on the reaction is estimated in many cases by the change of equilibrium or rate constants. However, solvation factors of reactants and products are rarely analysed, even though such work is useful when studying mechanisms of reaction.

We have previously reported the calorimetric determination of the enthalpy of solvation [2, 3] and the (1 + 4)-cycloaddition reaction of three-coordinated phosphorus derivatives to benzyl compounds [1]. It was noted that the development of research into the thermodynamics of organophosphorus compounds, as well as other heteroatomic compounds, is restricted to an extremely small number of works concerning enthalpy of vaporization. However for organophosphorus compounds it may be possible to use the method recently proposed for the determination of

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[1] For Part 4 see ref. 1.